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OF

THE GEOLOGICAL SOCIETY OF MINNESOTA

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*Prestons:
On Beckwith's Extension of the Eganoff
Theory.*

THE GLOOM OF THE WORLD IS BUT
A SHADOW; BEHIND IT, YET WITHIN OUR
REACH IS JOY. TAKE JOY . . .

Fra Giovanni,

A. D. 1513.

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FIELD TRIPS: May until October inclusive.

Annual dues: Residents of Hennepin and Ramsey counties \$ 3.00 plus \$ 1.00
additional for husband, wife, or dependent family members; for students
and non-residents, \$ 1.00.

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EDITORIAL

DIRECTORY - We are pleased to announce that this issue of the Minnesota Geologist contains a new membership directory. This directory differs somewhat from previous directories. We have omitted the listing of professions and occupations and we have eliminated the separate listing of family members. Since we were unable to get a complete telephone listing of the membership, we hope you will send the omitted phone numbers and any other corrections or additions to the editors. We will publish all corrections and list new members from time to time so that you may add this to your directory.

LECTURES - The series of lectures being given this winter to our Society by Dr. Robert F. Sloan are outstanding both in their presentation and subject matter. Each week he covers a different part of Minnesota geologically. We feel sure that by spring we will all have a very sound and thorough understanding of the geology of our own state. Those of you who have been attending each week will agree it is well worth the time and effort to attend. We urge all members who possibly can attend to do so, and to encourage and invite others to attend also.

A GEOLOGICAL STORY - "Minnesota Rocks and Waters" by Drs. George H. Schwartz and George A. Thiel is an account in non-technical terms of the major geological features of the state. Tourists and vacationers will find this a fascinating basis for planning field trips in any part of Minnesota. 161 illustrations. Paper edition \$ 3.00; cloth edition \$ 4.00 from The University of Minnesota Press, Minneapolis 14.

THE EARTH SCIENCE DIGEST - The official Midwest Federation Magazine, The Earth Science Digest, has been given a "new look" typographically and pictorially. The changes set off to greater advantage the amazing array of interesting articles on the earth sciences collected issue after issue by the editor, Dr. Ben Hur Wilson geologist, and William H. Alloway, rockologist extraordinary. If not a subscriber, send \$ 2 now to Box 1257, Chicago 90, Illinois, so as not to miss the current bi-monthly issue, which is the best yet.



WE WISH
YOU ALL
A Happy
New Year

BULLETIN BOARD

LECTURE PROGRAM

Jan. 4	A Geologic Tour Through Northwestern Minnesota	Dr. Robert E. Sloan
Jan. 11	A Geologic Tour Through North and West Central Minnesota	Dr. Robert E. Sloan
Jan. 18	A Geologic Tour Through North and West Central Minnesota	Dr. Robert E. Sloan
Jan. 25	A Geologic Tour Through the Minnesota River Valley	Dr. Robert E. Sloan
Feb. 1	A Geologic Tour Through Southwestern Minnesota	Dr. Robert E. Sloan
Feb. 8	A Geologic Tour Through Southeastern Minnesota	Dr. Robert E. Sloan
Feb. 15	A Geologic Tour Through the St. Croix River Valley	Dr. Robert E. Sloan
Feb. 22	Minnesota Paleontology	Dr. Robert E. Sloan
Mar. 1	A subject to be selected	Dr. Robert E. Sloan
Mar. 8	A subject to be selected.	Dr. Robert E. Sloan
Mar. 15	Geologic Features and Land Use of Minnesota	Dr. John Gorchert
Mar. 22	To be selected.	
Mar. 29	To be selected.	
April 5	Last Summer's Field Trip	J. Orville Engen
April 12	Members of the Society will show slides of various parts of Minnesota	
April 19	The History of the Theory of Glaciation—Henry Sommers	
April 26	Annual banquet in the Junior Ball Room Goffman Memorial Union.	

THE ROCKS CAN TELL MANY ROMANTIC STORIES.

The greatest and most important historical record ever written is enclosed in the rocks of the earth's crust. This extraordinary document lies all around us. In spite of the fact that many of its pages are missing and that great parts of it lie veiled in the obscurity of the distant past, the main truths may still be read and, when these have been deciphered, they present a series of vast panoramas tremendous in their sweep and intensely dramatic. This great book of geologic history, which has recorded the story of the earth and its inhabitants through nearly two billion years, reveals how many events that occurred millions of years ago have profoundly affected the course of human history and shaped the destinies of nations. It is difficult to conceive of anything that has had a greater influence upon the development of our country than the vast iron and copper deposits in the Lake Superior region; yet these were formed countless ages ago. Many of the things that we regard as essentials today are possible only because of events that occurred in the very distant past, while most of the materials that are necessary in this modern age come from the earth. Thus they all represent some phases of geology.

Since it became a planet, our world has passed through a remarkable series of changes. The familiar features of its present time-worn surface have not always existed. Mountain ranges once towered to great heights in regions where seemingly endless plains now stretch to the horizon. Sun-baked deserts have been replaced by well-watered farming lands and great forest areas. Vast shallow seas have invaded the continents from time to time, and their ancient shore lines may still be traced in many places. Tremendous changes such as these seem incredible to most people, but they are no more startling than the spectacular procession of animals that moved across the scene during past ages. Great herds of elephants were formerly as common in North America as they are today in parts of southeastern Asia or Africa. Huge reptiles once flew in the air, swam through the seas, and wandered widely over the lands. Camels, members of the rhinoceros family, lions, true wild horses, and a host of other animals that are utterly foreign to this land today were once natives of what we know as the United States. The whole course of geologic history reveals the constantly changing face of the earth and the development of life upon it, from the forms of primitive creatures to the higher races of mankind. Without the information found in the rocks, this most significant of all historical records would have remained unknown.

Most people are aware that geological science has made important contributions to human welfare, particularly in the development of natural resources; but few stop to think that a little knowledge of geology may give large aesthetic rewards. The works of nature are more inspiring than anything that the art of man has produced. Nothing is more beautiful than the earth upon which we live. To almost everyone mountains and valleys, great canyons, deserts, plains, and rivers are interesting merely as scenery; but the really intelligent observer will want to know more about the origin and the history of such features. The development of a lively curiosity about the innumerable geological features on every hand, together with the study that will gratify that curiosity, cannot fail to make all travel more enjoyable and life far richer for anyone. Every excursion will then become an adventure of the mind, and the great scenic regions of the world will have new and important meanings. Only by knowing the distant past as it is revealed through the medium of historical geology can we understand the present.

Reprinted from "Historical Geology"
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THE SUMMER FIELD TRIPS OF 1954.

June 6. Led by Charles Howard.

A trip to Redwood Falls and Morton. Granites and gneisses at Morton; weathered granites and krollin in Alexander Ramsey Park and many other interesting stops made a full day.

June 20. Led by Hal McElveth.

In the Spring Valley area of Wisconsin. Points of interest were marcasite nodules, fossil in Plattville limestone, trilobites in Lodi shale, a fault and interesting stop at the farm of T. C. Venasse who has a wonderful display of minerals.

July 11. Led by Mr. & Mrs. Lawrence King.

The theme of this trip was a study of the drainage courses made by melt waters of the last glacier. Stops were made to inspect glacial moraines and kames; various types of glacial till; Jordan sandstone and Oneota dolomite; ending the days trip by a visit to a tall remnant of St. Peter sandstone.

July 17 to 31. Led by J. O. Farnen.

This was the two week field trip which began by crossing into Canada at Sioux St. Marie, across Canada to Montreal Quebec, then into the United States again at New Hampshire for a view of the White Mountains, then to Vermont into the Green Mountains for granite and verble quarries. A part of the Adirondack Mountains were seen in New York, then south of the Finger Lakes and to Niagara Falls in time for a collapse of some rock at the American Falls. The trip was finished by ferry across Lake Michigan.

August 8.

The Lawrence Kings were hosts to the Society at their summer home on the St. Croix River. This was the annual picnic and get together.

August 21 - 22. Led by George Pickert.

A trip by bus to Dubuque Iowa where George showed some lead and zinc mines with some of the geology of the area thrown in.

September 17-18-19. Led by Marie Harris and Margaret Paschke.

A trip by bus stopping Friday night at Duluth. Saturday noon lunch at Grand Marais with overnight stop at Little Marais. Too much rain on Saturday prevented some of the stops planned which made a very busy day for Sunday.

The Society wishes to extend its thanks to the leaders of the past summer's field trips for their work in the preparation of an instructive outline.

We wish to extend a special note of thanks to Elmer Brown for his organization of the trips, and his many contributions to the field work.

EDITORS NOTE - A brief discussion on The Precession of the Equinox was published in the Minnesota Geologist, winter issue of 1951-52.

THE CAUSE OF THE GLACIER PERIODS.

A Discussion of Mr. A. P. Rickmire's Theory

by Chas. H. Preston.

For several years Mr. A. P. Rickmire of the Minnesota Geological Society has advocated an explanation for the cause of glaciers. He has lectured to the Society on two occasions, and demonstrated his theories at the Mid-western Federation meeting, held at Macalester College in 1952, and has prepared much literature on the subject which he has mailed out to his friends. He recently published a pamphlet reproducing his various writing on the matter.

Mr. Rickmire deserves much credit for his intensive study of the subject. Our founder, Mr. Edward P. Burch, nursed an intense ambition that the society serve to develop many students of the earth sciences, students who would pursue some phase of those sciences and to contribute their work to the furtherance of the Society. Mr. Rickmire appears to have been one of the very few who have made such study and deserves the consideration of each member of our society for his efforts. If he were right in his theory it should bring world attention to Mr. Rickmire and incidentally to our Society. We owe it to him to give him that consideration. I, for one have given his theory considerable study, and think it only fair to Mr. Rickmire and to the Society to set forth my conclusions.

I believe that he is basically wrong in his assumptions and will here discuss two of those assumptions, and try to show how he is in error.

First, I will attempt to outline his theory and hope I am not mistaken.

Mr. Rickmire believes that the precession of the equinoxes offers the explanation for glacial periods.

Without attempting to become involved as to the meaning of "precession", I will merely state that all astronomers agree that the earth's axis is at an angle of 23 1/2 degrees from "verticle" (or a line perpendicular to the plane of its orbit,) and that the axis "gyrates" just as a spinning top, which is not verticle to the floor, gyrates. While the top is rapidly spinning, its axis describes a cone, i.e. it swings around a circle, the axis first pointing to North then North East, then East, then South, then West, etc., its axis remaining at the same angle from "verticle", until the top becomes "tired", on account of friction, and falls to the floor.

In the same way the axis of the earth "gyrates", i.e. slowly revolves around a center which would be a line perpendicular to its planes of orbit (or the ecliptic circle). This revolution takes approximately 26,000 years and the North Pole swings about the heavens in a huge circle once during this time. As there is no friction the earth does not become "tired".

These facts are not in dispute, but Mr. Rickmire imagines that the earth's axis slowly changes in relation to the earth itself, and that is where I think he is wrong. Two of his assumptions I wish to challenge.

1. He assumes that the earth's axis is swinging about so that the poles, (the ends of the axis,) are moving about on the surface of the earth describing a circle of $23\frac{1}{2}$ degrees. In this way the polar region would be shifting, and what is a polar region today would be a warm region 13,000 years from today, and a polar region again in 26,000 years. Thus, he claims, we may expect glacial periods every 26,000 years.

2. He assumes that the bulge at the equator (the earth's diameter at the equator is approximately 26 miles greater than at the poles) would - unless the equator were slowly shifting, gradually expand until the earth would take the shape of a pancake - would flatten out to a disc. Hence, the necessity of some strong force to swing that equator North and South, so that bulge would be spread and thus controlled.

I will discuss these assumptions in reverse order.

In the second assumption Mr. Rickmire appears not to have gone far in the study of physics. There is no tendency for that bulge to increase.

Sir Isaac Newton, probably the greatest physicist of all time, formulated some of the fundamental laws of motion nearly 300 years ago. These laws have been accepted by physicists ever since. Newton set forth one formula which pertains to rotating bodies, as well as revolving bodies. This formula enabled him to compute the extent of that bulge, long before Geodetic surveyors attained the accuracy which enabled them to measure the bulge. Given, the mass, the speed, and the weight or gravitational "pull" he was enabled to compute the extent of that bulge with reasonable accuracy.

The centrifugal force, i.e. that force which tends to increase the bulge, or flatten out the earth, is in exact balance with the centripetal force, that force of gravity which tends to draw in this bulge to make an exact sphere. Unless the speed of rotation changes, or the force of gravity changes, that bulge will not increase or diminish.

A better illustration of the balance between the two forces, centrifugal and centripetal, is in the revolution of the earth around the sun. These two forces are in exact balance, so that the time of revolution can be computed to the second. According to Mr. Rickmire's theory, the path of the earth -- its orbit -- would constantly increase until the earth would fly off into space.

The two forces are in exact balance. He ignores the fact that the weight of that great mass of earth, represented in the bulge, is 13 miles thick and 25,000 miles long (around the earth) and presents a gravitational pull that holds that bulge from expanding. Greater speed would create force, and consequently, a greater expansion of that bulge. But with its present speed it will not expand.

Mr. Rickmire seems to believe that "precession" is a force which pulls the equator North and South so as to spread the bulge.

"Precession" is not a force, but the result of other forces. The rotation of the earth makes it similar to a gyroscope and serves to hold the axis and the equator where they are without change. As the earth's axis always inclines at the same angle we have the same seasonal change and the polar regions always remain in the same position on the earth's surface.

But it is not necessary to dwell on the fundamental laws of physics to prove that Mr. Rickmire is wrong. His first assumption is that the poles shift about on the surface of the earth, traveling around a common center describing a circle on the surface of the earth itself with a radius of $2\frac{1}{2}$ degrees, thus changing the location of the poles. He entirely ignores the published results of very careful surveys made by the International Institute of Geodetic Surveyors, who have made yearly calculations of the location of the North Pole for a period of some fifty years. These surveys record but a slight variation of less than 40 feet in all that time and the variation has not been in one direction but hovering about a common center. This slight variation is accounted for by a variation in the thickness of the ice sheets in the polar regions.

The axis of the earth simply is not shifting. It would be impossible to shift that axis by any conceivable force except some explosion. When a top gyrates, the whole top gyrates, not simply its axis.

In what a mess would be our system of surveys, could Mr. Rickmire's fancy be true.

At a spot near the road side of Glenwood Boulevard is a stone monument, or marker on which is engraved, "This spot is the half way point between the equator and the North Pole". Mr. Rickmire would have us believe that that stone marker should be on wheels. It must move about $\frac{1}{10}$ of a mile each year as the North Pole moves about his imaginary route. That marker should have engraved on it, "This was the spot of July 1, 1876", or some such date. The observer can then imagine where the spot is in the year 1954. (Some 31 miles away.)

In 1818, the United States made a treaty with England fixing the Canadian boundary between the Lake of the Woods and the Rocky Mountains along the 49th parallel. By now, this boundary would be some 50 miles North, or South? We might yet take in the rich oil fields around Edmonton. In 1846, we made another treaty with England extending the boundary along the 49th parallel to the Vancouver Bay. By 1846 wouldn't that 49th parallel have moved 11 or 12 miles North? or would it be South? so to have caused a wide gap in that boundary?

Wisconsin was admitted to the Union in 1848 with its southern boundary fixed at the parallel of $42\frac{1}{2}$ degrees North latitude. By now that boundary would approach Milwaukee, or would it be Chicago?

In 1836, the boundary between Iowa and Minnesota was fixed at the parallel of $43\frac{1}{2}$ degrees North. By now that parallel would be approaching Winona, or Dubuque?

There are thousands of bench markers established by the surveys on which are inscribed the exact locations in latitude and longitude. The locations would mean nothing by now. Our entire system of surveys would be in a mess.

Mr. Rickmire would have us believe that our glacial periods would be at intervals of 26,000 years. This would mean more than 100,000 glacial periods since the world began. I know of no geologist who would admit this.

Mr. Rickmire's theory is simply not tenable.

To summarize: 1 -- There is no tendency for the equatorial bulge to increase.

2 -- The north pole does not change its position in relation to the earth.

We must all look for some other cause of the glaciers.

ARE YOU ACTIVE?

Are you an active member, the kind
that would be missed?
Or are you just contented that your
name is on the list?
Do you attend the meetings and
mingle with the flock?
Or do you stay at home and criticize
and knock?
Do you take an active part and help
the work along?
Or are you satisfied to be the kind
to just belong?
Do you ever go to see a member who
is sick?
Or leave the work to just a few and
talk about the clique?
So come to the meetings often and
help with hand and heart;
Don't be just a member, but take
an active part.
Think this over, member, for you
know right from wrong,
Are you an active member, or do you
just belong?

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GEOLOGICAL SOCIETY OF MINNESOTA
MEMBERSHIP DIRECTORY
1955

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Jane Luckey	457 Roy St. No.	St. Paul 4
Mary Lupient	212 Bedford St. S.E.	Mpls. 14 Minn.
Jellaine Malmstrom	3622 Dupont Ave. No.	Mpls. 12 Minn.
Mr. & Mrs. Donald Mackin	5511 Brede Ave.	St. Paul Minn.
Dr. & Mrs. Edw. H. Mandell	Veterans Hospital	Saginaw Mich.
John G. Marshall	127 N. Lexington Pkwy.	St. Paul 4
Mrs. Flora Martinson	4815 W. Shakopee Road	Mpls. 20 Minn.
Mary A. Mayotte	5906 Clinton Ave.	Mpls. 9 Minn.
Mrs. Dorothea McCoy	2041 Grand Ave.	St. Paul 5
Mrs. T. McSherry	985 Scheffer St.	St. Paul 2
Hal E. McWhety	2174 Doswell Ave.	St. Paul 8
Miss Ethel M. Mellen	1900 Franklin Ave. S.E.	Mpls. 14 Minn.
Elizabeth Miner	2225 N.E. Taylor	Mpls. 18 Minn.

Handwritten notes:
 4112
 4253
 1998
 3869
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 8916
 5534
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 5013
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 4763
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 4278
 0973
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 7254
 6475
 1674
 2318
 2694

Wm Westwood 3910

Wm Westwood 3910
 Mc 4-8694

2367 Mc Menemey Rd
 St Paul 17